Municipality/Organization: Town of Carver

EPA NPDES Permit Number: MAR041099

MaDEP Transmittal Number: W-050154

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Annual Report Number & Reporting Period: **No. 4: March 2006-March 2007**

NPDES PII Small MS4 General Permit Annual Report

Part I. General Information

Contact Person: William Halunen Title: DPW Superintendent

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Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature:

Printed Name: Richard J. LaFond

Title: Town Administrater

Date: 7-19-07

Part II. Self-Assessment

The Town of Carver has make progress towards meeting various components of the NPDES Phase II Stormwater Discharge Permit. Public education, outreach and participation have been on-going throughout the permit year. The illicit detection and elimination program is on-going, stormwater regulations have been developed by the Board of Health and the Town adopted stormwater management bylaws. Each year, the DPW follows good housekeeping practices and keeps the storm drain system clean of debris.

Part III. Summary of Minimum Control Measures

1. Public Education and Outreach

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 4 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 5
PE-1	Flyer Distribution	DPW	Once per year at Hazardous Waste Day	Hazardous Waste Day was held on May 5, 2006. The program included disposal opportunities for electronic equipment. These programs were sponsored through the Carver, Marion, Wareham Regional Refuse Disposal District (CMWRRDD)	CMWRRDD will continue to inform residents of opportunities to dispose of household hazardous wastes. Hazardous Waste Day scheduled for May 2007
Revised					
PE-2	Informational Mailings	DPW	Houses adjacent to outfalls	Program continued	Program continued
Revised			1 per year to all houses adjacent to outfalls		
PE-3	Community Group Meetings	DPW	1 Meeting per year	Members of the community participated in the Carver Clean-up Day held on June 16, 2006. Meetings between the Town Planner and Developers take place as needed.	Hold Clean-up day annually and encourage public participation.
Revised					
PE-4	Public Service Announcements	DPW	Cable Access Ads for Events	Program continued. Public service announcements related to stormwater meetings, hazardous waste days, recycling, cleanup day, etc. were placed on cable access TV.	Program continued
Revised					

1. Public Education and Outreach (continued)

BMP ID #	BMP Description	Responsible Dept./Person Name	Measurable Goal(s)	Progress on Goal(s) – Permit Year 4 (Reliance on non-municipal partners indicated, if any)	Planned Activities – Permit Year 5
PE-5	Information Distribution	DPW	Posts on Town website	Mailings are sent to all members of the CMWRRDD announcing the schedule for Household Hazardous Waste Collection Days. The Carver Board of Health designed a brochure describing wetland values and functions. This brochure is available at www.buzzardsbay.org and at the Town Hall offices.	Mailings will continue. Board of Health will continue their program of disseminating information about wetlands and open space.
Revised			Minimum of one post per year on town website.		

1a. Additions

The right mix of development for fiscal balance

As we stated earlier, a town cannot expect to remain solvent when the vast majority of development consists of mid-range homes with children in the public schools. We have calculated that the average house in Carver today, with an assessed value of $140,000, costs the town $3,366 per year over and above what is paid in taxes. In fact most homes valued at less than $340,000 (which constitute over 95% of the homes in Carver) create a deficit. Carver has escaped the full impact of this deficit in recent years because of two factors: a split tax rate which has partially closed the gap by shifting a larger burden onto commercial property owners, and a big inflow of equity aid from the state. But neither of these factors can be relied upon to continue.

The solution that has been advanced in the past to counter-balance this deficit has been to promote commercial and industrial development. This is a worthwhile objective, and various strategies for encouraging economic development are taken up in the Master Plan. But the reality is that commercial and industrial development alone are not the answer. Given the location of Carver, it is unlikely that our town will ever have enough economic development to offset the residential development that is coming, or that we would like the community that would result even if it were possible.

The Master Plan proposes a broader mix of residential uses as a more viable way to maintain financial health as we grow. This mix would contain not just mid-priced single-family housing, but also a significant percentage of the types of housing that are revenue-positive, such as townhouses, age-restricted housing, and higher-priced homes. While there are many formulas that could achieve fiscal balance, we have suggested the following percentages as an attainable goal:

Housing type	Average value	Mix %
SF moderate	$230,000	10
SF middle	$275,000	35
SF high	$375,000	35
SF great estates	$500,000	10
Townhouses	$210,000	10

Assumptions:

- Break-even valuation for SF house with children: $340,000
- Break-even for 2-br townhouse w/o children: $67,000
- Great estates = 5+ acre lot

In the Housing section of the Master Plan, we give more detail about the likely financial impact of each of these housing types, as well as an overview of the market forces at work in Southeastern Massachusetts that suggests that this mix is feasible.

The benefits to expanding our range of housing types go beyond simply achieving fiscal balance. By offering more variety, we provide more options for the people who live in the community. Currently, a young couple, single person, or retired couple looking for an apartment or condo cannot find one in Carver, and the family hoping to upgrade to a nicer home without moving out of the community has very few choices. We also will draw *new* people to the community who would not currently consider settling here. Carver would benefit from attracting a certain percentage of more affluent homebuyers. The low-to moderate income demographics of the town, (including lower education levels than most surrounding towns), are often reflected in low

levels of citizen participation in town government and lack of support for local businesses. Carver will never be affluent, but a greater demographic range would bring needed resources into town.

And what about affordable housing? Compared to many nearby towns, Carver is already quite affordable. And fully a third of our housing units are mobile homes, which provide a very affordable option to seniors. This existing housing stock will continue to provide a solid base of affordably-priced homes even as the cost of new construction continues to rise. In addition, our smart-growth plan includes some apartments, townhouses and other moderately priced housing.

For families and the elderly who are unable to afford even these options, M.G.L. 40B has required that10% of the housing in every Massachusetts town be subsidized. Although we could argue that this standard is excessive, because it disregards our huge stock of mobile homes and converted cottages, it is clear that a need exists. But the town's efforts to meet that need must rest on the foundation of fiscal stability. A town with a healthy mix of market-rate housing is most able to provide for the needy.

Village Areas

As we have said earlier, the fundamental principle of smart growth planning is to increase density in areas where infrastructure exists and to reduce density where open space and natural resources exist, rather than let development sprawl evenly all over the landscape.

The Master Plan, proposes several Village Areas including the existing historic village centers and some adjacent lands with potential for development:

- *North Carver:* includes Route 44 Study area and North Carver Green
- *Center Carver*: includes village and general business areas adjacent to Town Hall
- *South Carver*: includes historic village area
- *Future development*: includes the Makepeace lands

Of the four, Center Carver has the greatest potential for developing a lively mixed-use village – a true town center. The area would improve with the addition of quite a bit of compact housing, and some commercial infill to give the area more of the feeling of a town and less of a strip. Apartments on the second floor of commercial buildings would increase housing options. And finally, the area needs to be unified with generous sidewalks, attractive lighting and other streetscape improvements. The Master Plan suggests some new design guidelines that would help this vision of a town center become a reality.

The North and South Carver village areas can also accommodate a modest amount of new housing and commercial development, as long as it is sensitive to the historic character of the areas. South Carver Village should be given Historic District status to help protect it as it grows. This will be especially important since South Carver will serve as the gateway to the Makepeace development and will be under considerable pressure from the additional traffic. North Carver includes the Route 44 study area, where several parcels with development potential have been identified.

Besides these three traditional areas, it is likely that other sites for higher-density development will emerge as large chunks of land come on the market, such as the proposed Makepeace project. We hope that the Makepeace project will serve as a model for evaluating and shaping other such proposed developments.

To encourage the appropriate mix of development in these HD areas, we are proposing a number of strategies, such as reducing lot sizes and setbacks and encouraging townhouses, which are outlined on page 7.

Creation of a decentralized water system

Development of town water lies at the heart of any village-centered planning. Without some kind of public water system, compact village areas are very difficult to achieve because of the wide separation required between wells and septic systems. A *town-wide* water system is neither necessary nor economically feasible. The cost of such a system would be prohibitive because of the total length of roadway relative to future density. In addition, it appears that our current system of private wells meets the needs of most residents, and should continue to be sufficient as long as the aquifer is protected.

However, a *decentralized* system is both feasible and desirable. This decentralized system would have three distinct water districts taking water from three different sources and delivering it to strictly defined high-density areas adjacent to those sources. (See Map 1.)

- *North Carver*: piping from Middleboro
- *Center Carver*: served by the Town Hall well (land acquisition is necessary to expand the well buffer zone and increase output)
- *South Carver*: served by the Cranberry Village well (land acquisition also necessary.)

In South Carver, the municipal wells at Cranberry Village would be developed to serve not only the village area, but also the new project proposed by Makepeace, and to possibly provide a revenue source by supplying the water deficient areas in South Middleboro. Outside the strictly defined Village Areas, residents would continue to use private wells (or small community systems such as the well in South Meadow Village), unless there is a problem such as contamination.

A word about sewerage: at this time it does not seem feasible that the town will ever have a town-wide sewer system, for the same reason that it won't have a town-wide water system. However, in order to promote more compact development in certain Village Areas, the town should encourage small private treatment systems. Standards need to be defined for these systems so that they don't become a problem for the town or its citizens.

Rural Open Space Areas

Promoting village areas in a rural community only makes sense when paired with the other half of the equation – the reduction of the final buildout density in priority open space areas. Map 2 shows a broad-brush scheme for identifying the most vital open space lands in Carver. It is our goal that when property within these areas comes out of agricultural use, the land is either:

- permanently protected in its entirety
- developed into oversized lots (defined as lots of 3 acres or more), or
- developed in a cluster pattern that groups the houses compactly on the land, leaving the balance of the land protected and allowing construction to stay well away from resource areas like wetlands.

In the Master Plan we recommend a number of strategies to help attain this goal. These strategies, which are outlined on page 7, include increasing lot sizes and frontage, revising the cluster bylaw to provide more incentives for clustering, and protecting up to 4,500 acres of key open space through acquisition or conservation restriction.

Staffing and Organization

On page 8 are outlined a number of facilities and services that will be necessary to make this vision a reality. First and foremost, there is a need for a staff planner. Many of the strategies outlined in this report require more study. And even when the whole plan is implemented, a much more sophisticated level of review will be required than has been needed under our current system. This kind of flexible response is beyond the expertise of most volunteer boards without professional guidance.

Summary

Carver's greatest assets are its open space and its small-town character. With the wave of growth coming to Southeastern Massachusetts, these assets could easily be lost to sprawl. Encouraging compact mixed-use village centers while steering development away from open space areas is a viable way to prevent this erosion of our unique character.

The strategies outlined in this report would also reduce the final build-out population of Carver by about 25%. The increase in lot size alone would decrease the ultimate population by 5,600 people or 2,050 housing units, while the protection of land via acquisition or conservation restrictions would further reduce the buildout by 3,000 residents or 1,200 units. This would be beneficial to our environment, our quality of life, and our fiscal health.

ACTIONS FOR IMPLEMENTING FIVE-PART PLAN

Village Areas

Zoning

- Map boundaries of Village Areas by examining current land-uses and identifying parcels with potential for additional development
- Allow smaller residential lots within Village Areas where water system is in place
- Allow apartments over stores (in accordance with performance standards)
- Refine list of allowed commercial uses
- Allow townhouses on smaller lots in Village Areas

Design Standards

- Adopt maximum front setback to bring buildings closer to street
- Decrease side lot setbacks to bring buildings closer together
- Promote streetscape improvements such as better sidewalks, street trees, lighting
- Encourage infill of existing low-density strip-style development

Health and Environmental Standards

- Adopt water and septic management regulations for Village Areas

Organizational

- Create public/private task force including new EDIC to seek additional funding for planning, streetscape improvements and infrastructure development within Village Areas

Decentralized Water System

- Create Water/Stormwater/Wastewater Planning Committee
- Seek funding for water/stormwater planning through DEP Comprehensive Water Resources Management Plan
- Obtain support of Buzzards Bay Project to assist in stormwater planning
- Undertake hydrologic studies of target areas
- Negotiate connections to Middleborough to supply water to Rt. 44 area
- Acquire bogs adjacent to Town Hall and South Carver wells to allow expansion of pumping capacity
- Obtain funding for system development

Rural Areas

Zoning and Planning Board Regulations

- Increase lot sizes to two acres and frontage to 200 ft. in order to reduce overall development and protect resources
- Revise cluster bylaw to provide more incentives for clustering, including as-of-right clustering, and density bonuses for certain public benefits
- Adopt new road standards to allow for a reduction of width, etc. for smaller subdivisions
- Adopt site-plan review for large residential developments

Additional strategies to protect natural resources

- Adopt stormwater protection standards
- Update Aquifer Protection Bylaw
- Update Wetlands Bylaw: mapping and resource area protection
- Adopt Flood Hazard District zoning
- Establish a land bank to accept donations and hold protected lands
- Enact Community Preservation Act to create a source of funding for open space protection
- Develop a system for transferring development rights away from most sensitive areas towards areas more suitable for development (TDR)
- Acquire land or development rights to @ 4,500 acres of critical open space, including a 3,000 acre greenbelt linking Rocky Gutter in Middleboro to Miles Standish State Forest via the Edaville site.

Staffing and Organizational Changes

- Retain economic development/planner
- Re-organize EDIC
- Adopt Economic Opportunity Area Designation (with Plymouth)
- Complete 2-year Housing Program (Executive Order 418)
- Institute inter-board review process for major projects
- Complete GIS data base and acquire GIS mapping and analysis capability

Vision for the Town of Carver

The Action Plan diagram locates the Village Areas where infrastructure improvements including public water, road, and new development will be encouraged as well as the Rural Areas where there will be an effort at land preservation and the encouragement of cluster housing. In pursuit of this Action Plan, the town envisions itself in the year 2020 as having:

VISION STATEMENT

- *A regional system of trails interconnecting major open spaces including Myles Standish, Makepeace, Edaville Railroad, and Rocky Gutter Wildlife Refuge (Middleborough) in order to promote tourism and protect local agriculture;*
- *Higher density, new growth in self-sufficient, mixed use, village areas where water supply and wastewater needs will be fully addressed according to Town standards;*
- *A campus setting for municipal facilities bounded by a revitalized New England town center and an improved Route 58;*
- *Quality schools and public safety;*
- *Staffing of local government to provide the diverse management, regulatory, economic development and environmental protection needs its citizens and businesses requested in order to not be overwhelmed by growth;*
- *The presence of a historic town spirit which increases the involvement of students in local affairs and of its citizens in managing local government.*

Following this Executive Summary are the eight elements which comprise the Master Plan.

Section I: *Land Use,* presents a description of the existing land use , development capacity under existing zoning, a discussion of alternative land use strategies for managing growth, and a series of recommendations.

Sections 2-7 address the different components of the community including *Housing, Economic Development, Open Space, Historic Resources, Public Facilities, and Transportation*. For each of these sections basic inventory information is presented, followed by an analysis of issues and opportunities, the presentation of a Vision and Goal statement, and ending with a series of Recommendations.

Section 8, *Implementation Strategy.* An Action Plan is discussed which identifies by Phase the tasks and responsible party for carrying out the Master Plan.

Stormwater Management Standard
Applicability

Applicability

The Stormwater Management Standards apply to industrial, commercial, institutional, residential subdivisions, multi-family residential projects, and roadway projects, including site preparation, construction, redevelopment, and on-going operations.

The Stormwater Management Standards do not apply to ([1])

(1) Single-family house project;
(2) Emergency repairs to roads or their drainage systems.
(3) Redevelopment of Existing Properties

The Stormwater Management Standards do apply to the extent practicable to:

(1) Residential subdivisions with four or fewer lots with a discharge potentially affecting a critical area; and
(2) Five to nine residential lots, provided any discharge will not affect a critical area.

The Stormwater Management Standards do apply to:

(1) Five to nine residential lot residential subdivisions with discharges potentially affecting critical areas and any subdivision of 10 or more lots, as well as all commercial and industrial developments. Residential development that is a part of a phased development project does not qualify for an exemption.
These thresholds do not preclude these activities from meeting applicable state regulatory requirements not directly related to the stormwater discharge.

Table: Stormwater Management Standards Applicability for Subdivision Projects

Project Type	Not Affecting Critical Areas	Affecting Critical Areas
Single Family House	Not Subject to Standards	Not Subject to Standards *
2-4 Lot Subdivision	Subject to the Extent Practicable	Subject to the Extent Practicable
5-9 Lot Subdivision	Subject to the Extent Practicable	Must Meet the Standards
> 10 Lot Subdivision	Must Meet the Standards	Must Meet the Standards

Where Critical Areas are: Outstanding Resource Waters, Public Swimming Beaches, Cold Water Fisheries, and Recharge Areas for Public Water Supplies.

[1] For projects of any size, direct discharges of untreated stormwater from pipes to wetlands or waters are not allowed. Erosion and sedimentation controls during construction must be provided for all land disturbances in excess of 5,000 square feet.

Carver Board of Health

Regulations for Storm Water and Runoff Management

CARVER BOARD OF HEALTH

Regulations for Storm Water and Runoff Management

PURPOSE

The goal of the Carver Stormwater Management Regulation is to improve water quality and address water quantity problems by the implementation of performance standards for stormwater management. Urban runoff and discharges from strormwater outfalls are the single largest source responsible for water quality problems in the Commonwealth's rivers, lakes, ponds, and marine waters. The Massachusetts Department of Environmental Protection Stormwater Management Standards establishes clear and consistent guidelines for stormwater management in Massachusetts. The Standards are designed for use under multiple statutory and regulatory authorities of the Department of Environmental Protection, including the Wetlands Protection Act, as amended by the Rivers Protection Act, and the Clean Water Act.

Stormwater discharges occur as rainfall and snowmelt carry pollutants to surface and groundwater. New and existing development increases impervious surfaces, which alters natural drainage features, increases peak discharge rates and volumes, and reduces recharge to maintain wetlands and base flows in streams. Development also results in corresponding increases in the concentration and types of pollutant loadings, including thermal impacts to streams, nutrient, solids, metals, salt, pathogens, pesticides, and hydrocarbons. Best Management Practices (BMPs) reduce or prevent pollutants from reaching water bodies and control the quantity of runoff from a site. The Stormwater Management Standards address both water quality (pollutants) and water quantity (flood control) problems by establishing the level of required controls through the use of BMPs.

The Carver Stormwater Management Regulations are intended to be applied during routine project review by issuing authorities. Use of standards should prevent or minimize adverse environmental impacts due to unmanaged stormwater while limiting undue costs and recognizing site constraints. These regulations for stormwater management are intended to protect the public and environmental health by providing adequate protection against pollutants, flooding, siltation, and other drainage problems.

REGULATION

I. The storm water management design shall include a control strategy and plan for Source Control and Best Management Practice (BMP) for any particular development or project and shall accomplish the following goals:

- A. Reproduce, as nearly as possible, the hydrological conditions in the ground and surface waters prior to a development.
- B. Reduce storm water pollution to the "Maximum Extent Practicable" (MEP) using Best Management Practices (BMPs).
- C. Have an acceptable future maintenance burden as determined by the Town of Carver Department of Public Works for roadways to be accepted as Town Ways.
- D. Have an acceptable operation and management plan for all private development.
- E. Have a neutral effect on the natural and human environment.
- F. Be appropriate for the site, given physical restraints.
- G. Provide a sufficient level of health and environmental protection during the construction phase.

II. An acceptable storm water management plan shall:

- A. Capture and treat the "First Flush" of a storm, usually the runoff from the first one inch of precipitation for the total impervious area of the development site or a value as may be designated by the Carver Board of Health.
- B. Not cause an increase or decrease in either the total volume of runoff discharged offsite, or total rate of runoff discharged offsite, as compared with the respective discharge offsite prior to the development. Such condition shall be required for storms of 1, 10, 25, 50 and 100-year frequency events.
- C. Include source controls and design of BMPs and Infiltration and Detention structures in accordance with the procedures acceptable to the Carver Board of Health such as required in the following publications and regulations:
  - a. Department of Environmental Protection, Surface Water Discharge Permit Program; 314 CMR 3.00
  - b. Department of Environmental Protection, Wetland Protection Act Regulations; 310 CMR 10.00
  - c. Department of Environmental Protection, Stormwater Regulations; 314 CMR 5.0
  - d. Department of Environmental Protection, Groundwater Discharge; 314 CMR 5.0
  - e. Department of Environmental Protection, Groundwater Quality Standards; 314 CMR 5.0
  - f. Department of Environmental Protection, Water Quality Certification; 314 CMR 5.0 (401)

g. Department of Environmental Protection, Rivers Protection Act Regulations; 310 CMR 10.00
h. Department of Environmental Protection, Dam Safety; 302 CMR 10.0
i. United States Environmental Protection Agency, Clean Water Act; National Pollutant Discharge Elimination System (NPDES), Stormwater Phase 1 Rule (55 FR 47990) for MS4s
j. United States Environmental Protection Agency, Clean Water Act; National Pollutant Discharge Elimination System (NPDES), Stormwater Phase 2 Draft for MS4s

D. In cases where runoff infiltration cannot, in the opinion of the Carver Board of Health, be appropriately implemented because of the possibility of contamination of water supply, or because of extremely poor infiltration and permeability characteristics of the soil, the requirement as regards volume may be waived by the Carver Board of Health provided the applicant provides such additional preventive measures to prevent any increase in elevation or duration of downstream flood elevations. Such additional measures may be, but are not restricted to, the construction of compensatory flood storage facilities and/or the creation of additional wetlands.
Poor infiltrative and permeability conditions are defined as Hydrologic Soil Group "D" as published by the USDA NRCS Soil Service and may be confirmed by "insitu" permeability testing resulting in a permeability of less than 1 x 10 (-4) centimeters per second. Unless, in the opinion of the Carver Board of Health, such testing is not applicable for a particular site, all permeability tests shall be in site field bore hole tests for permeabilities in the acceptable range as specified above. If permeability testing is desired to be performed in soils of lesser permeability, laboratory tests for hydraulic conductivity shall be performed on undisturbed samples by the Falling Head Permeability using flexible membrane triaxial test cells with backpressure (Army Corps of Engineering Manual EM 1110-2-1906 Appendix VII).

E. If detention or retention ponds are utilized, slopes shall be no steeper than four horizontal to one vertical. Maximum design water depth shall not exceed three (3) feet except in permanent ponds. Minimum bottom slope for "wet and dry" detention areas shall be two (2) percent, and infiltration ponds shall be graded flat. A safety bench, a minimum of ten (10) feet wide shall be provided. Detention or retention areas shall not be constructed within existing steam bed or wetland areas.

F. Not result in channelization of surface runoff offsite without the written consent of the owner of the land affected, in the form of a permanent grant of easement, recorded at the Registry of Deeds.

G. Include all hydrologic and hydraulic calculations and data to support the proposed design for the stormwater runoff drainage system. Both volume and flow rate of runoff before and after proposed development must be clearly stated and shall be in accordance with the specifications previously designated herein. Calculations shall be performed based on the most recent Atlas of Precipitation published by Cornell University (attached) as well as the most recent procedures of the U.S.D.A. Soil Conservation Service such as are described in the National Engineering Handbook - Section 4 - Hydrology (SCS 1985), TR - 20 "Computer Program of Project Formulation Hydrology" (SCS 1983), and Technical Release No. #55 "Urban Hydrology for Small Watersheds" (SCS 1986). Additional design guidelines may be on file With the Carver Board of Health.

H. The Carver Board of Health reserves its rights to grant variances to the above requirements should they deem the variances to be in the best interest of public health and safety.

III. The Carver Board of Health, Commonwealth of Massachusetts acting in accordance with Chapter 111, Section 31 of the Massachusetts General Laws and amendments and additions thereto, and by any other power thereto enabling, and acting thereunder have adopted STORMWATER AND RUNOFF MANAGEMENT REGULATIONS for the preservation of public and environmental health.

A. Voted on:
B. Effective on:

STORMWATER GUIDANCE ATTACHMENT

24 HOUR RAINFALL

This Atlas of Precipitation has been published by the Northeast Regional Climate Center at Cornell University. It provides accurate data for the 24 hour Rainfall and precipitation of storm events. This atlas should be used to calculate the 24 hour Rainfall, as it is scientifically sound and up to date. Otherwise, structures for stormwater infiltration, retention, detention, and other BMP's may be incorrectly and /or undersized for real storm events.

This Atlas:

1. Utilizes the advances in statistics methodology and computing power since 1961.
2. Provides results determined from data of stations having an average length of record of 51.3 years as compared to the data of TP-40, which had an average length of record of 22.6 years.
3. Recognizes that the frequency of heavy rain events has increased since 1961. TP-40 encompasses a relatively dry period compared to the past 40 years.
4. Provides empirical adjustment factors to transform precipitation amounts pertaining to calendar day observations to maximum precipitation regardless of time of observation.

Analysis of the 1993 Northeast Regional Climate Center Atlas for Plymouth County, corrected for the 24-Hour Storm, result in the following rainfall values.

24-Hour Storm	Rainfall (inches)
1	2.82
2	3.39
5	4.24
10	5.08
25	6.22
50	7.34
100	9.04

The title of this atlas is *Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada*, Cornell University, Ithaca, New York, Publication No. RR 93-5, September 1993. A second publication entitled *Atlas of Short-Duration Precipitation Extremes for the Northeastern United States and Southwestern Canada*, Publication No. RR 95-1, March 1995, is also available